

### **REMARKS**

Applicant has now had an opportunity to carefully consider the Office Action of September 8, 2005. Re-examination and reconsideration are respectfully requested.

#### **The Office Action**

Claims 1-42 were presented for examination.

Claims 26-30 were rejected under 35 U.S.C. § 112, second paragraph due to issues related to antecedents.

Claims 1-4, 8-10, 25, 31-34, 37 and 38 stand rejected as being anticipated by Sakabe et al. ('149).

Claims 12-16, 19-24, 26-30, 41 and 42 stand rejected as being obvious of Sakabe et al. ('149).

Claims 5-7, 11, 17, 18, 35, 36, 39 and 40 stand rejected under the combination of Sakabe et al. ('149) and Schwartz et al. ('738).

Claim 26, 38 and 41 have been canceled.

New Claims 43-50 have been added.

#### **Independent Claim 1 and Its Dependent Claims 2-24 and New Dependent Claims 43 and 44 are Distinguished**

Independent claim 1 has been amended to include a filter network as part of the background current circuit. Particularly, as shown in Figure 9, and discussed on page 13, beginning on line 6 of the present application, the embodiment shown in Figure 9 includes a filter network comprised of capacitor 260, and current inrush limiting resistors 262 and 264. This filter network will result in a continuous DC background current wave shape that essentially fills in the valley between the positive and negative current portions 242, 244 as shown in Figure 5. Thus, this system flattens the background current and allows even lower current welding operations than previously attainable. Implementation of the filter concept permits the current to be maintained in existence without a fill-in by successive SCR spikes.

In reviewing the cited Sakabe et al. '149 patent, as well as the Schwartz et al. '739 patent, no such filter network concepts are taught or fairly suggested for an electric arc welder as recited in claim 1.

It is respectfully submitted, for at least these reasons, newly amended claim 1 is distinguished from the cited art.

As dependent claims 2-24 and 43-44 depend from and further distinguish this claim, it is submitted they are also distinguished.

Additionally, with attention to dependent claims 11-14, the Office Action argues that, while the '149 patent did not teach the specific resistances set forth in these claims (*i.e.*, in a range of about 20-30 ohms), such a distinction is not patentably distinguishable as it would have been obvious to have used a wide range of values for resistance 10 in Sakabe et al. '149. Applicant respectfully traverses this position. For the low voltage welder of the present application, a concern is that unnecessary resistance in the circuit will affect the desired operation. In particular, it is stated in Sakabe et al. '149 in column 5, beginning on line 68, that such an issue had been considered, and it was determined to make "sure that the current-limiting element 10 is sufficiently effective herein even when the value thereof is as high as 10 ohms."

Thus, this patent explicitly teaches that the highest ohmic value of a system designed in accordance with the teachings of their circuitry, would be 10 ohms. However, the present application particularly recites that the resistance of the background current circuit 100 (which includes resistors 150 and 152 as separate resistors) can be in the range of 20 to 30 ohms, and preferably about 24-25 ohms. This arrangement permits a welding operation of about 2 amperes at 13 volts. Thus, the circuit design of the present application permits for more resistive control than that available by the Sakabe et al. '149 patent. In consideration of the above claims 12-14 are considered distinguished from the cited art.

Applicants have also added new dependent claim 43, which specifically calls for the filter network to include a capacitance and a current inrush limiting resistance. This claim further defines the filter network of claim 1.

New dependent claim 44 details the concept of the background resistance being comprised of a positive half-cycle resistance and a negative half-cycle resistance, the positive half-cycle resistance and the negative half-cycle resistance having different ohm values. As discussed on page 13 of the application, in connection with Figure 10, the circuit designed in this embodiment allows low current cleaning or penetration during AC

operation of the background current circuit. Particularly, it is shown that rectifier 300 includes DC resistors 310, 312 during the positive half-cycle, and 314, 316 during the negative half-cycle. By adjusting the total resistance of resistors 310, 312 with respect to resistors 314, 316, the current during the positive and negative half cycle have different magnitudes. During AC operation, these magnitudes are different directions to allow more cleaning or penetration of the workpiece, even during low current operation when essentially the background current is doing the welding.

It is respectfully submitted, for at least these reasons, the concepts of the present claims recited above are not taught or fairly suggested by the applied art.

**Independent Claim 25 and Remaining Dependent Claims 27-30 and New Dependent Claims 45-46 are Distinguished**

Independent Claim 25 has been amended to emphasize the background current resistance is in a range of 20 to 30 ohms. It is respectfully submitted for the reasons detailed above (in connection with dependent claims 11-14) the concept of an electric arc welder operating in accordance with the concepts of present claim 25 is not taught by the cited references. In particular, Sakabe et al. '149 particularly recites that its welder will employ a maximum of 10 ohms as the current resistance. For these reasons, it is respectfully submitted this claim is not taught or fairly suggested.

Dependent claims 27-30 and 45-46 are distinguished as being dependent upon the above independent claim 25.

In addition, new claim 45 incorporates the concept of the background current circuit having a filter network which is configured to generate a continuous DC background current wave shape by the background current circuit.

New dependent claim 46 recites the concepts of a positive half-cycle resistance and a negative half-cycle resistance having different ohm values. As previously discussed, this imbalance permits for additional cleaning or penetration of the workpiece even during low current operation when essentially the background current is doing the welding.

It is submitted, for at least these reasons, the concepts of claim 25 and dependent claims 27-30 and 45-46 are not taught or fairly suggested.

**Independent Claim 31 and Its Dependent Claims 32-36 and New Dependent Claims 47-48 are Distinguished**

Independent claim 31 has been amended to include the concept of a filter network. For the reasons previously recited in connection with independent claim 1, it is respectfully submitted this feature is not taught or fairly suggested in the cited art.

As independent claim 31 has been shown to be distinguished, it is submitted dependent claims 32-36 and 47-48 are also distinguished as being dependent thereon.

In addition, new dependent claim 47 further emphasizes that the filter network includes a capacitance and a current inrush limiting resistance.

New dependent claim 48 recites that a background resistance is comprised of the positive half-cycle resistance and the negative half-cycle resistance, and wherein the positive half-cycle resistance and negative half-cycle resistance have different ohm values. This concept permits for the additional cleaning and penetration in the welding process.

For at least these reasons, it is submitted independent claim 31 and its dependent claims 32-46 and 47-48 are distinguished.

**Independent Claim 37 and the Remaining Dependent Claims 39-40 and 42, as well as New Dependent Claims 49 and 50, are Distinguished**

Independent claim 37 has been amended to include the concept of the background resistance being comprised of a positive half-cycle resistance and a negative half-cycle resistance. As previously noted, this construction permits for the positive half-cycle resistance and negative half-cycle resistance to have different ohm values, which in turn allow the imbalanced background current to allow more cleaning and/or penetration of the workpiece even during low current operation. At least these concepts are not taught or suggested in the cited art.

As dependent claims 39-40, 42 and 49-50 are dependent from the distinguished independent claim 37, it is submitted they are also distinguished.

In addition, new dependent claim 49 sets forth the concept of the background circuit, also including a filter network which is configured to generate a continuous DC background current wave shape by the background current circuit. This design permits the generation of flattened background current, which allows even lower current welding operations than with systems not using the filter network.

Dependent claim 50 further defines the filter network includes a capacitance and inrush limiting resistance.

For the reasons detailed above, it is submitted independent claims 37 and its dependent claims 39-40, 42 and 49-50 are distinguished from the cited art.

**CONCLUSION**

For the reasons detailed above, it is submitted all claims remaining in the application (Claims 1-25, 27-37, 39, 40, 42 and 43-50) are now in condition for allowance. An early notice to that effect is therefore earnestly solicited.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he/she is hereby authorized to call Mark S. Svat, at Telephone Number (216) 861-5582.

Respectfully submitted,

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Dec. 1, 2005  
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